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Received: October 20, 2016
Accepted: October 21, 2016
Published: October 26, 2016

JHEP10(2016)148

Erratum: Helicity evolution at small x

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Erratum to: JHEP01(2016)072

ArXiv ePrint: 1511.06737

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Article funded by SCOAP[3].

doi:10.1007/JHEP10(2016)148

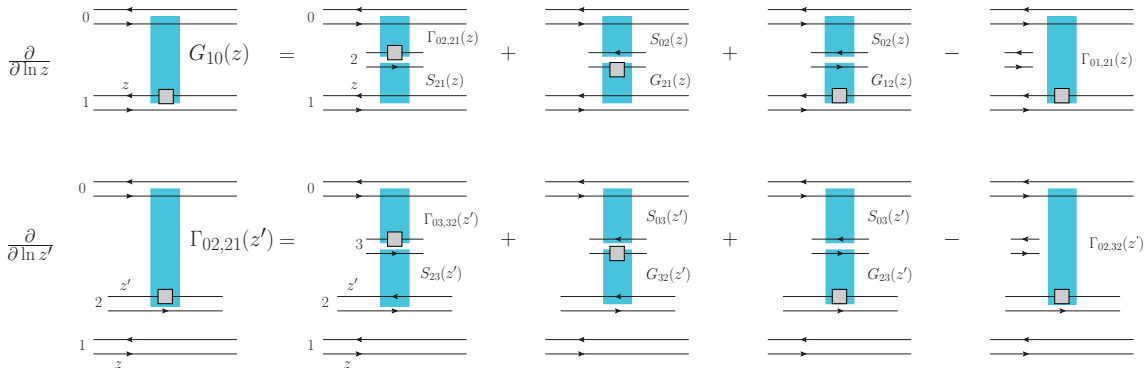

Figure 1. Large-N_c helicity evolution for the polarized dipole amplitude G and the neighbor dipole amplitude Γ. As before, for pictorial simplicity we do not show the contributions of the initial condition terms. Double lines denote gluons at large N_c. Only one of the virtual diagrams is shown (last diagram in each line): virtual corrections to the right of the shock wave are implied, but not shown explicitly.

- On the right-hand side of eq. (5.13) one should have $U_{\underline{2}}^{pol\,\dagger\,ab}$ and $U_{\underline{1}}^{unp\,\dagger\,ab}$ instead of $U_{\underline{2}}^{pol\,\dagger\,ba}$ and $U_{\underline{1}}^{unp\,\dagger\,ba}$ respectively.
- On the right-hand side of eq. (5.17) one should have dz'/z' instead of dz'/z.
- On the right-hand side of eq. (5.18b) one should replace $V_{\underline{1}}^{unp\,\dagger}$ by $V_{\underline{2}}^{pol}$. One should also add $\frac{1}{N_c^2-1}\left\langle \mathrm{tr}\left[U_{\underline{1}}^{pol\,\dagger}\right]\right\rangle_0(z)$ to the right-hand side of eq. (5.18b).
- Eq. (5.35) should read

$$G_{10}(z)=G_{10}^{(0)}(z)+\frac{\alpha_s\,N_c}{2\pi^2}\int\limits_{z_i}^{z}\frac{dz'}{z'}\int\limits_{\rho'^2}\frac{d^2x_2}{x_{21}^2}\,\theta(x_{10}-x_{21})\,[2\,\Gamma_{02,\,21}(z')\,S_{21}(z')+2\,G_{21}(z')\,S_{02}(z')$$
$$+\,G_{12}(z')\,S_{02}(z')-\Gamma_{01,\,21}(z')] \quad (5.35)$$

- Eq. (5.37) should read

$$\Gamma_{02,\,21}(z')=\Gamma_{02,\,21}^{(0)}(z')+\frac{\alpha_s\,N_c}{2\pi}\int\limits_{z_i}^{z'}\frac{dz''}{z''}\int\limits_{\rho''^2}^{\min\{x_{02}^2,x_{21}^2\,z'/z''\}}\frac{dx_{32}^2}{x_{32}^2}\,[2\,\Gamma_{03,\,32}(z'')\,S_{23}(z'')+2\,G_{32}(z'')\,S_{03}(z'')$$
$$+\,G_{23}(z'')\,S_{03}(z'')-\Gamma_{02,\,32}(z'')]\,. \quad (5.37)$$

  with the last terms on the right of figure 13 relabeled yielding figure 1 here.
- The following clarifying paragraph should be added after figure 13: "We had to double the coefficients of the first two terms on the right-hand side of eq. (5.35) to account for the fact that, in the large-N_c limit, the factor associated with the polarized gluon emission by the gluon is four times larger than the factor associated with the polarized gluon emission by a quark (see e.g. the right column of eq. (5.21)): only half of that difference is due to the color factors."

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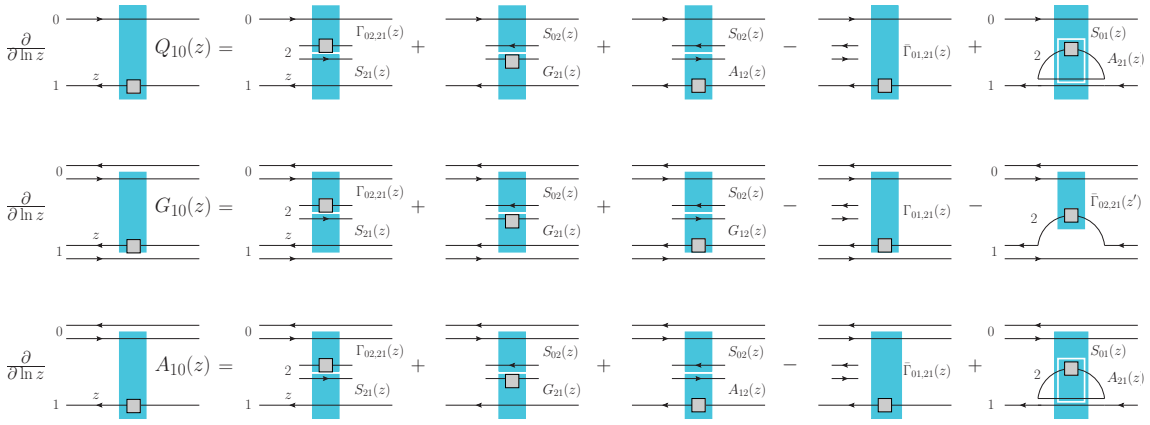

Figure 2. Large-N_c & N_f helicity evolution for the polarized dipole amplitudes Q, G and A.

- The following sentence should be added to the paragraph containing figure 14: "Note that the virtual (last) term in eq. (5.35) can be shown to bring in a neighbor dipole amplitude $\Gamma_{01,\,21}(z')$."

- Eqs. (5.38) should read

$$G_{01}(z) = G_{01}^{(0)}(z) + \frac{\alpha_s\, N_c}{2\pi} \int\limits_{z_i}^{z} \frac{dz'}{z'} \int\limits_{\rho'^2}^{x_{10}^2} \frac{dx_{21}^2}{x_{21}^2} \left[\Gamma_{02,\,21}(z') + 3\, G_{21}(z')\right], \tag{5.38a}$$

$$\Gamma_{02,\,21}(z') = \Gamma_{02,\,21}^{(0)}(z') + \frac{\alpha_s\, N_c}{2\pi} \int\limits_{z_i}^{z'} \frac{dz''}{z''} \int\limits_{\rho''^2}^{\min\{x_{02}^2, x_{21}^2\, z'/z''\}} \frac{dx_{32}^2}{x_{32}^2} \left[\Gamma_{03,\,32}(z'') + 3\, G_{23}(z'')\right]. \tag{5.38b}$$

- Eq. (5.42) should read

$$\begin{aligned} Q_{10}(z) = Q_{10}^{(0)}(z) &+ \frac{\alpha_s\, N_c}{2\pi^2} \int\limits_{z_i}^{z} \frac{dz'}{z'} \int\limits_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10} - x_{21}) \\ &\times \left[S_{21}(z')\, \Gamma_{02,\,21}(z') + S_{02}(z')\, G_{21}(z') + S_{02}(z')\, A_{12}(z') - \bar{\Gamma}_{01,\,21}(z')\right] \\ &+ \frac{\alpha_s\, N_c}{4\pi^2} \int\limits_{z_i}^{z} \frac{dz'}{z'} \int\limits_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10}^2 z - x_{21}^2 z')\, S_{01}(z')\, A_{21}(z'). \end{aligned} \tag{5.42}$$

- Eq. (5.43) should read

$$\begin{aligned} G_{10}(z) = G_{10}^{(0)}(z) &+ \frac{\alpha_s\, N_c}{2\pi^2} \int\limits_{z_i}^{z} \frac{dz'}{z'} \int\limits_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10} - x_{21}) \\ &\times \left[2\, S_{21}(z')\, \Gamma_{02,\,21}(z') + 2\, S_{02}(z')\, G_{21}(z') + S_{02}(z')\, G_{12}(z') - \Gamma_{01,\,21}(z')\right] \\ &- \frac{\alpha_s\, N_f}{4\pi^2} \int\limits_{z_i}^{z} \frac{dz'}{z'} \int\limits_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10}^2 z - x_{21}^2 z')\, \bar{\Gamma}_{02,\,21}(z'). \end{aligned} \tag{5.43}$$

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- Eq. (5.44) should read

$$A_{10}(z) = A_{10}^{(0)}(z) + \frac{\alpha_s\, N_c}{2\pi^2} \int\limits_{z_i}^{z} \frac{dz'}{z'} \int\limits_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10} - x_{21})$$
$$\times \left[S_{21}(z')\, \Gamma_{02,\,21}(z') + S_{02}(z')\, G_{21}(z') + S_{02}(z')\, A_{12}(z') - \bar{\Gamma}_{01,\,21}(z') \right]$$
$$+ \frac{\alpha_s\, N_c}{4\pi^2} \int\limits_{z_i}^{z} \frac{dz'}{z'} \int\limits_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10}^2 z - x_{21}^2 z')\, S_{01}(z')\, A_{21}(z'). \tag{5.44}$$

with some terms on the right of figure 16 relabeled to give figure 2 here.

- Eq. (5.45) should read

$$\Gamma_{02,\,21}(z') = \Gamma_{02,\,21}^{(0)}(z') + \frac{\alpha_s\, N_c}{2\pi} \int\limits_{z_i}^{z'} \frac{dz''}{z''} \int\limits_{\rho''^2}^{\min\{x_{02}^2,\, x_{21}^2\, z'/z''\}} \frac{dx_{32}^2}{x_{32}^2}$$
$$\times \left[2\,\Gamma_{03,\,32}(z'')\, S_{23}(z'') + 2\, G_{32}(z'')\, S_{03}(z'') + G_{23}(z'')\, S_{03}(z'') - \Gamma_{02,\,32}(z'') \right]$$
$$- \frac{\alpha_s\, N_f}{4\pi} \int\limits_{z_i}^{z'} \frac{dz''}{z''} \int\limits_{\rho''^2}^{x_{21}^2\, z'/z''} \frac{dx_{32}^2}{x_{32}^2}\, \bar{\Gamma}_{03,\,32}(z'). \tag{5.45}$$

- Eq. (5.46) should read

$$\bar{\Gamma}_{02,\,21}(z') = \bar{\Gamma}_{02,\,21}^{(0)}(z') + \frac{\alpha_s\, N_c}{2\pi} \int\limits_{z_i}^{z'} \frac{dz''}{z''} \int\limits_{\rho''^2}^{\min\{x_{02}^2,\, x_{21}^2\, z'/z''\}} \frac{dx_{32}^2}{x_{32}^2}$$
$$\times \left[\Gamma_{03,\,32}(z'')\, S_{23}(z'') + G_{32}(z'')\, S_{03}(z'') + A_{23}(z'')\, S_{03}(z'') - \bar{\Gamma}_{02,\,32}(z'') \right]$$
$$+ \frac{\alpha_s\, N_c}{4\pi} \int\limits_{z_i}^{z'} \frac{dz''}{z''} \int\limits_{\rho''^2}^{x_{21}^2\, z'/z''} \frac{dx_{32}^2}{x_{32}^2}\, S_{02}(z')\, A_{32}(z'). \tag{5.46}$$

with some terms on the right of figure 18 relabeled to give figure 3 here.

- Eqs. (5.47) should read

$$Q_{01}(z) = Q_{01}^{(0)}(z) + \frac{\alpha_s\, N_c}{2\pi^2} \int\limits_{z_i}^{z} \frac{dz'}{z'} \int\limits_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10} - x_{21})\, \left[G_{12}(z') + \Gamma_{02,\,21}(z') + A_{21}(z') - \bar{\Gamma}_{01,\,21}(z') \right]$$
$$+ \frac{\alpha_s\, N_c}{4\pi^2} \int\limits_{z_i}^{z} \frac{dz'}{z'} \int\limits_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10}^2 z - x_{21}^2 z')\, A_{21}(z'), \tag{5.47a}$$

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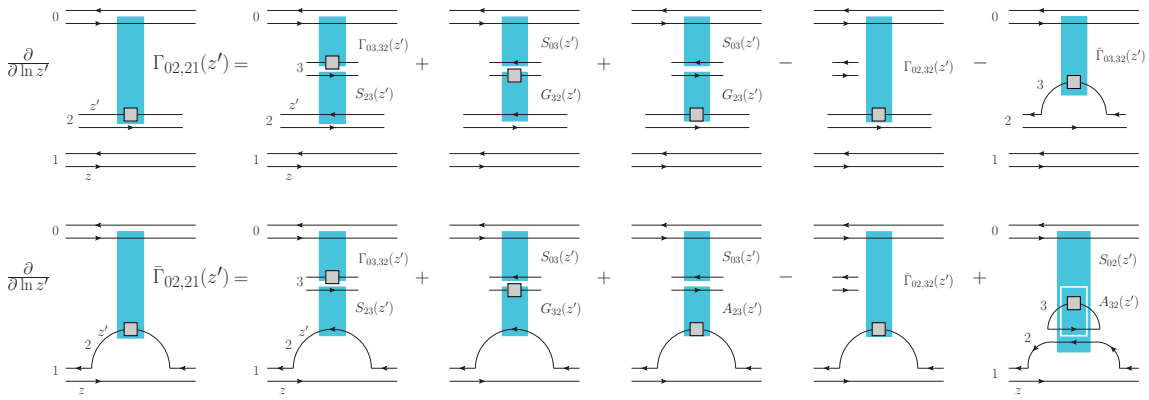

Figure 3. Large-N_c & N_f helicity evolution for the polarized neighbor dipole amplitudes Γ and $\bar{\Gamma}$.

$$G_{10}(z) = G_{10}^{(0)}(z) + \frac{\alpha_s\, N_c}{2\pi^2} \int_{z_i}^{z} \frac{dz'}{z'} \int_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10}-x_{21})\, \left[\Gamma_{02,\,21}(z') + 3\, G_{12}(z')\right]$$

$$- \frac{\alpha_s\, N_f}{4\pi^2} \int_{z_i}^{z} \frac{dz'}{z'} \int_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10}^2 z - x_{21}^2 z')\, \bar{\Gamma}_{02,\,21}(z'), \tag{5.47b}$$

$$A_{01}(z) = A_{01}^{(0)}(z) + \frac{\alpha_s\, N_c}{2\pi^2} \int_{z_i}^{z} \frac{dz'}{z'} \int_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10}-x_{21})\, \left[G_{12}(z') + \Gamma_{02,\,21}(z') + A_{21}(z') - \bar{\Gamma}_{01,\,21}(z')\right]$$

$$+ \frac{\alpha_s\, N_c}{4\pi^2} \int_{z_i}^{z} \frac{dz'}{z'} \int_{\rho'^2} \frac{d^2x_2}{x_{21}^2}\, \theta(x_{10}^2 z - x_{21}^2 z')\, A_{12}(z'). \tag{5.47c}$$

- Eqs. (5.48) should read

$$\Gamma_{02,\,21}(z') = \Gamma_{02,\,21}^{(0)}(z') + \frac{\alpha_s\, N_c}{2\pi} \int_{z_i}^{z'} \frac{dz''}{z''} \int_{\rho''^2}^{\min\{x_{02}^2, x_{21}^2\, z'/z''\}} \frac{dx_{32}^2}{x_{32}^2}\, \left[\Gamma_{03,\,32}(z'') + 3\, G_{23}(z'')\right]$$

$$- \frac{\alpha_s\, N_f}{4\pi} \int_{z_i}^{z'} \frac{dz''}{z''} \int_{\rho''^2}^{x_{21}^2\, z'/z''} \frac{dx_{32}^2}{x_{32}^2}\, \bar{\Gamma}_{03,\,32}(z'), \tag{5.48a}$$

$$\bar{\Gamma}_{02,\,21}(z') = \bar{\Gamma}_{02,\,21}^{(0)}(z') + \frac{\alpha_s\, N_c}{2\pi} \int_{z_i}^{z'} \frac{dz''}{z''}$$

$$\times \int_{\rho''^2}^{\min\{x_{02}^2, x_{21}^2\, z'/z''\}} \frac{dx_{32}^2}{x_{32}^2}\, \left[\Gamma_{03,\,32}(z'') + G_{23}(z'') + A_{23}(z'') - \bar{\Gamma}_{02,\,32}(z'')\right]$$

$$+ \frac{\alpha_s\, N_c}{4\pi} \int_{z_i}^{z'} \frac{dz''}{z''} \int_{\rho''^2}^{x_{21}^2\, z'/z''} \frac{dx_{32}^2}{x_{32}^2}\, A_{32}(z'). \tag{5.48b}$$

- The right-hand side of eq. (A.12) should be multiplied by 2.

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